Metal density and *weight calculator*

Typical densities, weight per square metre and the stockholder formulas, with the questions to ask before a lift or a load on a floor. Theoretical weights: confirm with the partner.

AT A GLANCE

Metal	Density, g/cm³ (= kg per m² for each 1 mm)	kg per m² at 3 mm	Where the figure comes from
Aluminium (6082, 5251 and pure)	2.70	8.1	6082 datasheet 2.70; 5251 datasheet 2.69; stockholder's table 2.70
Mild steel	7.85	23.6	Usual round figure; a stockholder's comparative table prints 7.8
Stainless, ferritic (430)	7.75	23.3	Stockholder's table 7.75; TL-MET-18 notes 7.7
Stainless 304	7.90	23.7	Euro Inox table of properties (2007); stockholder prints 7.92 for austenitic
Stainless 316	8.00	24.0	Euro Inox table of properties (2007)
Copper	8.90	26.7	Stockholder's table 8.90; copper CW024A datasheet 8.92
Brass	8.45	25.4	Brass CW508L 8.44, CZ121 8.5, stockholder's generic brass 8.47
Bronze, generic	8.89	26.7	Stockholder's table; phosphor bronze PB102 datasheet 8.85

Typical values for planning, not guarantees: grade, temper and tolerance move them. Weight in kg per m² equals thickness in mm times density in g/cm³. Confirm with the mill certificate or the partner's datasheet before any weight that matters, such as a lift plan or a load on a floor.



Weight of 1 m² of 3 mm sheet. Typical densities from stockholder and datasheet values; original chart by Make Bespoke Studio.

BAR AND TUBE FORMULAS (P IN KG/DM³, SIZES IN MM)

Form	Dimensions in mm	Weight	Result
Plate or sheet	t = thickness (mm)	t x ρ	kg per m²
Round bar	d = diameter	0.0007854 x d² x ρ	kg per m
Round tube	D = outside diameter, t = wall	0.0031416 x (D - t) x t x ρ	kg per m
Square or rectangular tube	a1, a2 = sides, t = wall	0.001 x (2 a1 + 2 a2 - 4 t) x t x ρ	kg per m

WORKED EXAMPLES

	Item	Result
A	Table frame in 25 x 25 x 2 mm square tube, 6.0 m of tube in all	1.44 kg per m, so 8.7 kg
B	Brass door panel, 2040 x 726 mm, 3 mm sheet	37.5 kg (2 mm: 25.0 kg)
F	The same 2400 x 1200 x 3 mm panel in aluminium and in mild steel	aluminium 23.3 kg, steel 67.8 kg

SPECIFICATION WORDING

WEIGHT STATEMENT

Partner to state, before shop drawings are approved, the estimated weight of each [assembly / panel / base] and of the heaviest single lift, calculated from the finished thickness [in mm], the dimensions and the density of the alloy named, giving the density used. Weights are estimates; the as-built weight to be confirmed by weighing [one sample / each item].

FIXINGS AND FLOOR

Fixings for [element] to be designed by [the partner / a named engineer] for a self-weight of [ ] kg and a [ ] kg imposed load, acting at [positions]. Where the base stands on [a raised or timber floor], the partner to give the weight and the size of each foot so that the floor can be checked by [the structural engineer].

COMPOSITE ITEMS

Weights of [wrapped or cored] items to include the core, adhesive, edge trim and hardware. The partner to list each component's thickness and material in the weight statement.

TERMS USED

Density

The mass of a material per unit of volume. For metals it is usually given in grams per cubic centimetre (g/cm³) or kilograms per cubic decimetre (kg/dm³), which are the same number; multiplied by 1,000 it is kilograms per cubic metre.

Theoretical weight

The weight calculated from nominal dimensions and a standard density. Actual weight differs with thickness tolerance, composition and shape.

STANDARDS AND SOURCES

- Stockholder's general data, Issue 3, 02/2011 (formulae, densities) and alloy datasheets: company publications, not standards.
- Euro Inox, Tables of Technical Properties, Vol. 5, 2nd ed. 2007: EN 10088-1 itself not read.
- BS EN 1991-1-1 and UK National Annex (floor loads): named only; not read. Confirm with a structural engineer.

Full guide: https://makebespoke.com/trade/technical/metal-density-and-weight-calculator. Make Bespoke Studio coordinates manufacture through its partner workshops. Figures are guidance only and your specification governs; some may be superseded, so contact the studio to verify.